EUROPEAN PATENT OFFICE

Patent Abstracts of Japan

PUBLICATION NUMBER : 2000077733
PUBLICATION DATE : 14-03-00

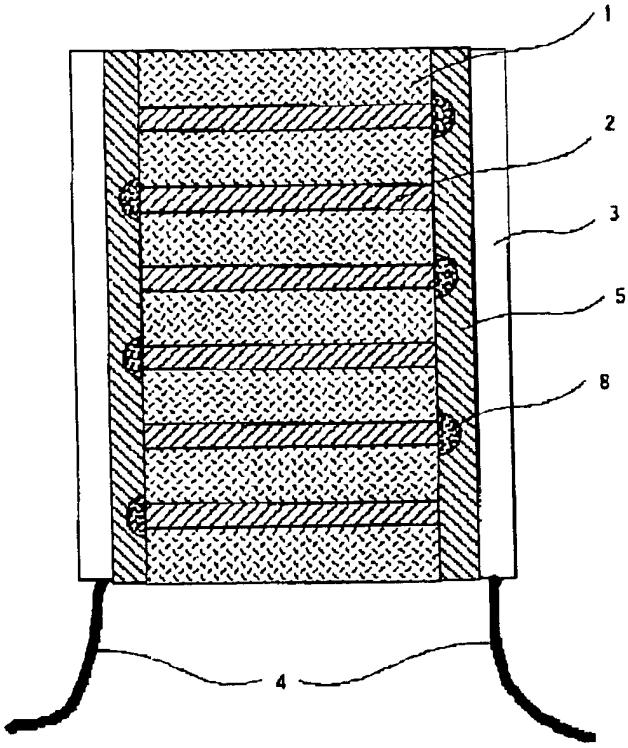
APPLICATION DATE : 27-08-98
APPLICATION NUMBER : 10241339

APPLICANT : HITACHI LTD;

INVENTOR : ISHIDA TOMIO;

INT.CL. : H01L 41/083 G01L 1/16

TITLE : LAMINATED PIEZOELECTRIC ELEMENT



ABSTRACT : PROBLEM TO BE SOLVED: To improve reliability of a laminated piezoelectric element extending over a long period even under a high temperature, by a method wherein piezoelectric materials having a piezoelectricity and internal electrodes having a conductivity are alternately laminated to form integrally the piezoelectric materials, and the internal electrodes and stress relaxation layers are respectively formed on the vertical side surfaces of the laminated material in the lamination direction.

SOLUTION: Piezoelectric materials 1 having a piezoelectricity and internal electrodes 2 having a conductivity are alternately laminated to form integrally the materials 1, the external electrodes 2 is connected to and the eternal electrodes 2 every other layer, and lead wires 4 are respectively connected with these electrodes 3. Moreover, stress relaxation layers 5, which are provided mixedly an inorganic porous material containing an silicon oxide as its main component with a conductive material containing conductive grains, such as silver grains palladium grains, are respectively formed between the materials 1 and the electrodes 3, between the electrodes 2 and the electrodes 3 and between insulating layers 8 formed on the electrodes 2 and the electrodes 3. As a result, even in the case where a laminated piezoelectric element is used extending over a long period under a high voltage, the reliability of the piezoelectric element can be improved.